Demystifying 21 CFR Part 11

for Software Quality Management for Healthcare, Pharmaceuticals, Biotechnology, and Medical Devices verticals

QMETRY

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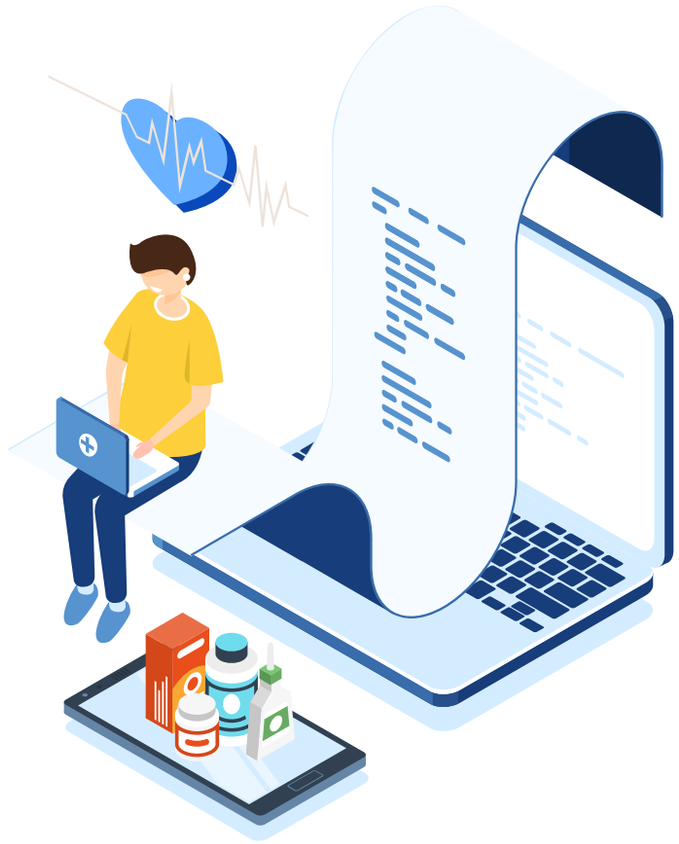
21 CFR Part 11 Introduction



What is FDA 21 CFR Part 11? This is one of the most asked questions in sectors that are impacted by it.

CFR Part 11 sets out the norms for companies operating in the US that use electronic quality records and digital signatures substituting paper-based documents and actual signatures (or 'wet signatures') in a manner that is compliant with the FDA regulations.

As organizations moved towards a paperless state with the advances in computer technology, electronic records and recordkeeping improved cost and time efficiency. However, on the flipside, the digital methods lacked the validation, reliability and authenticity that conventional pen & paper documentation could bring.

This loss of accuracy can have severe consequences in many companies where falsification of information can lead to a lot of wrongdoing. It could adversely impact many consumers. For example, patients who may receive damaged or out of date vaccines or other medical treatment. The healthcare industry is a primary example but not the only one. This is why the FDA has established the guidelines of 21 CFR Part 11 with three main objectives:

Three main objectives of 21 CFR Part 11

- Authenticate the validity of electronic records
- Confirm the authenticity of electronic signatures and records
- Validate the reliability of electronic records and signatures

For companies in healthcare and the medical device industry, it is imperative to review source code and requirements. This allows teams to reduce risks and shift-left, identifying defects as early as possible in the software development lifecycle. This is especially important for compliance and audit purposes.

FDA's ruling of 21 CFR Part 11 stipulates how electronic records and eSignatures must be used as a substitute for paper records and wet signatures. The ruling is largely applicable to e-records that are necessary for developing and manufacturing biotechnology, drugs and medical devices.

As a result, these companies that implement e-records or eSignatures as part of the FDA mandated quality system processes, need to look into 21 CFR Part 11 for specific guidance that dictates the use of technology in quality systems.

The scope of FDA 21 CFR Part 11 comprises electronic records, electronic signatures, audit trail, and computer systems.

The rules are applicable to medical devices, pharma, biotech, biologics development and other FDA-regulated industries. The laws codified as Part 11 of Title 21 in the Code of Federal Regulations are also known as 21 CFR Part 11 or Part 11 for the sake of brevity.

As such, 21 CFR Part 11 is divided into three sections:

1. The **General Provisions** section outlines the scope of the regulations including details of when and how it should be implemented and defines key terms used in the regulations.

2. The **Electronic Records** section explains the requirements for administration of closed and open electronic record-keeping systems. It also discusses signature manifestations and specifies the requirements for building a link between signatures and records.

3. The **Electronic Signatures** section is further divided into three sub-parts: general requirements for electronic signatures, electronic signature components and controls, and controls for identification codes/passwords.

How has Healthcare Industry evolved since introduction of CFR Part 11 in 1997?

The Healthcare and Life Sciences Industry has come a long way in their journey towards digitalization. It was in late 80s and early 90s that healthcare was burdened with mountains of paperwork which was a standard and procedural routine to follow. And then in 90s with computerization and the boom of internet, healthcare industry was introduced with “Electronic Health Record (EHR)” system.

Wide adoption of EHR across the world led to the opening of many possibilities and inventions at the same time. However, as Healthcare industry moved towards adoption of technology and digitalization, many regulatory compliances as well as Standards such as HIPAA were also introduced to ensure the highest level of safety and risk-mitigation in the interest of patients.

Since the launch of the first generation of iPhone in 2007, there have been a number of inventions and innovations in the realm of SMART DEVICES. Smart phones with various sensors to monitor health paired with the healthcare companion apps were launched following the iPhone revolution. And the success of Smart Phones with sensors also led to wearable tech in the healthcare industry such as Fitness bands, and tracking devices. In the last decade, IoT (Internet of Things) also began to pave its path in healthcare industry, making these services accessible, better in quality and easier to reach.

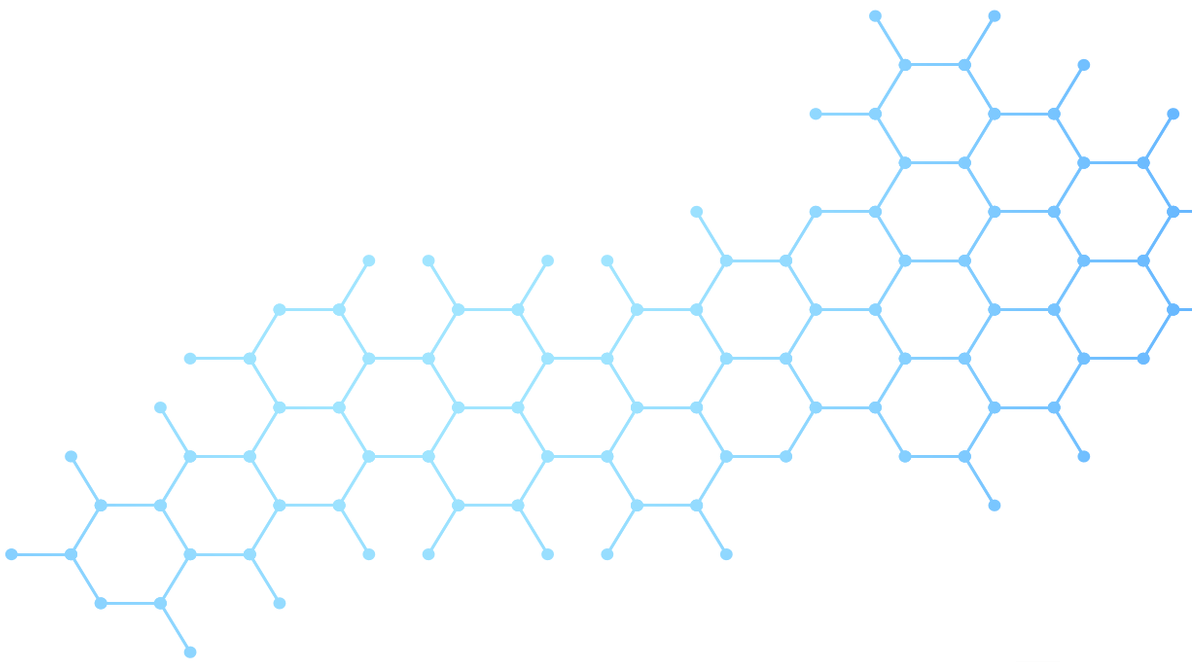
Not only we saw new technologies revolving around hardware devices, there was also a radical change in how these technologies were made available to people. It was a paradigm shift where the whole game changed from a transaction centric model to customer centric model. Customer centric model focused on providing high quality products very fast to the customers. And to achieve this, the way software applications were being built and shipped has also changed. The initial days of software development followed the waterfall — SDLC methodology which couldn't cope up with this faster go to market cycle. Companies started to move from this traditional method to Agile and DevOps practice to fulfil the customer needs and faster go to market.

Healthcare and Life Sciences companies are one of the most heavily regulated industries. Due compliances are in place to ensure that customers are provided products with the highest level of safety and best of quality. While the new software concepts and methods aim at helping teams roll out high quality products faster, Regulatory Compliances remains a challenge for these Healthcare companies. Compliances such as 21 CFR Part 11 can put a pressure on teams that require them to follow standards, process and record validation and verification to a great extent.

With so many new devices, apps and platforms coming in the play extensively, it required even higher level of validation process of the underlying software that these devices were using. If we only talk about 21 CFR Part 11, it was firstly introduced in 1997 when these new technologies and methodologies didn't exist. So, over the time to accommodate evolving the technologies FDA also revised 21 CFR Part 11 giving us the final version in 2003.

With this newer version of 21 CFR Part 11 coming into play, healthcare companies were finally able to comply to these regulations. And these healthcare players started to look for modern tools that can help them follow compliance and at the same time also ensure faster go to market.

These modern tools are available as a SaaS based platform that makes sure that teams have access to real-time data and analytics. Modern Test Management Tools like QMetry support eSignature, Audit Trails and many other features that help teams to organize and manage their testing along with supporting compliance. The main objective of such modern tools is to empower teams and organizations by simplifying the validation of their software and thus help reach market quickly with confidence.



Simplify Regulatory Compliance with QMetry

Organizations across industries and sectors have gone paperless with the help of electronic document management systems and record-keeping. However, for compliance-driven organizations like healthcare and banking, this requires the substitution of actual signatures with electronic signatures.

Electronic signatures offer businesses a secure way of verifying authenticity of records and documents. How are these implemented?

In quality management systems, where approvals and reviews are required from various teams, often geographically dispersed, e-signatures streamline the workflow.

In healthcare, when developing products — both software and hardware for use in the medical, pharma or healthcare IT systems, it is mandatory to follow a requirements and quality management process in line with FDA Title 21 CFR Part 11 set of Federal Regulations. These guidelines define the criteria for electronic records and eSignatures to be considered reliable, trustworthy and the equivalent of paper records.

eSignature

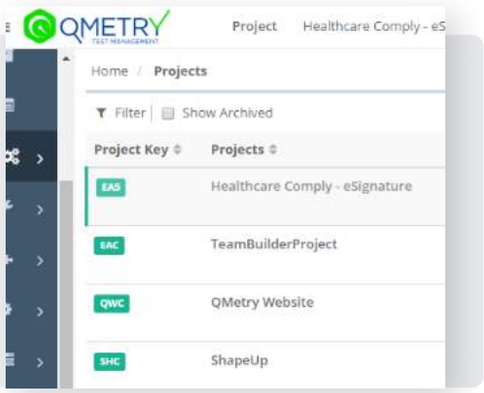
QMetry offers Approval workflow and auditing reports with eSignature to produce evidences that can be used for SOW and other Audit compliance. The eSignature feature helps organizations to regulate the Approval Workflow of test cases and test executions. Test Case executions can now be approved using an eSignature that verifies that the test run was documented correctly and authenticates the test run status assigned to the Test Case.

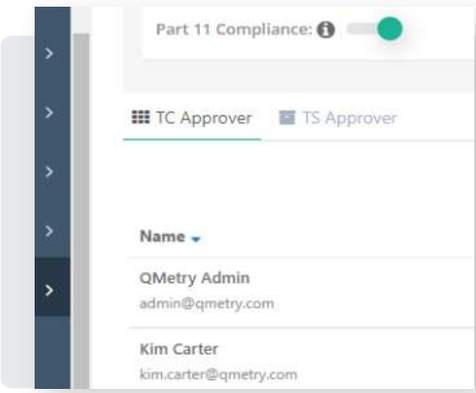
How does eSignature work?

To help QA teams align all their efforts to construct quality test cases, QMetry empowers the management to keep a check on the changes to a test case and how it can be integrated into test executions.

✓ Step 1: Decide the project for eSignature

First, companies must review and select all the projects for which they want to enable eSignature functionality. It's possible that there are a few projects that are stipulated under the compliance and governance norms, which makes it imperative to enable eSignature. However, there could be another team working on project that doesn't require this approval mechanism. After enabling eSignature, you can then enable Part 11 Compliance Flag.





✓ Step 2: Add Approvers

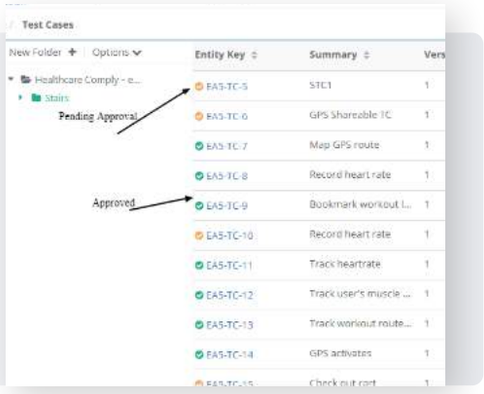
Once, your project has eSignature and Part 11 enabled, you must add users who will be approvers. There are two types of approvers:

1. Test Case Approvers: They will have rights to approve the test cases that are authored.
2. Test Suite Approvers: They will have rights to approve created test suites and also approve the executions captured for these test suites.

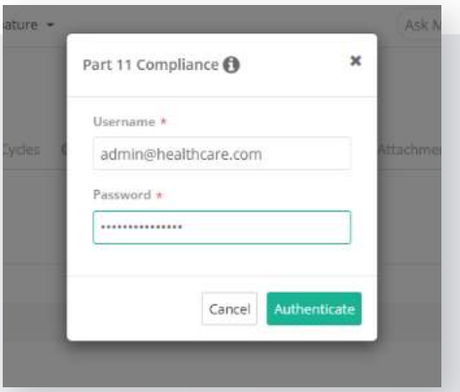
✓ Step 3: Test Case Authoring

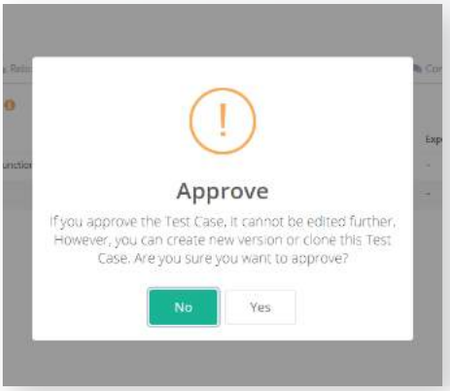
Testers will start authoring test cases and once they are submitted, these will be sent to the approver for approval.

What is "Locked-in Phase"?
The test case that has been submitted for approval and has not yet been approved enters locked-in phase. Meaning, testers cannot link such unapproved test cases with test suite and hence, they cannot be executed. However, they can keep on editing these test cases until they are approved by the designated approver.



Approval Flow
Approvers will be able to view these test cases and approve them. To comply with 21 CFR Part 11, QMetry will ask the approver to reauthenticate by entering their login credentials for approving.



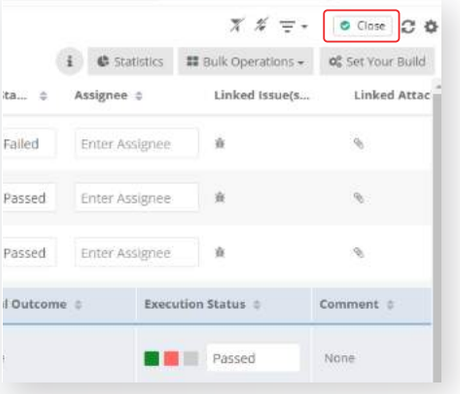


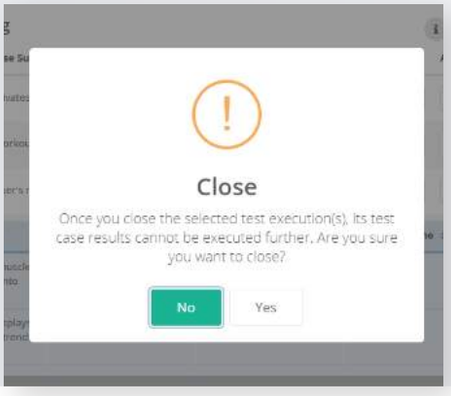
Once correct credentials are entered, test cases will be approved and can no longer be edited. If someone needs to edit them, they will have to create another version of the test cases.

✓ Step 4: Test Suites and Test Executions

Testers will create test suites and link the approved test cases for their execution. However, test cases cannot be executed until the test suite is approved. Again, the created test suite enters the “Locked-in Phase” until they are approved by their designated approver.

On the other hand, to approve these test suites, the approver will have to enter their credentials to comply with 21 CFR Part 11. Once the test suite is approved, testers can execute the test cases and log the test results. And these execution results will again go in “Locked-in Phase” until they are approved.

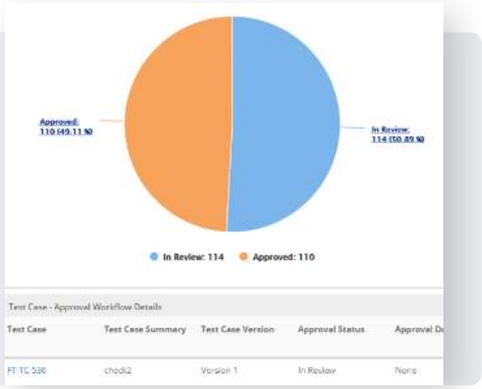




To complete the whole cycle, Test Suite approvers will have to “CLOSE” the test suite. This will be considered as the final approval in this testing workflow.

✓ Step 5: Approval Workflow Report

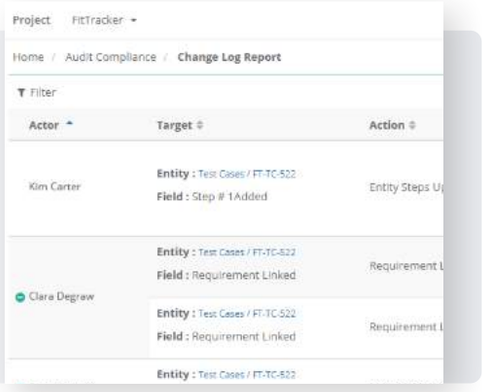
Approval Workflow report summarizes details on Test case approval & Test Execution approval based on Project, Release and Cycles. QA managers/Project Auditors use this report for audit reasons wherein they can find out which test cases/test suite/executions are in “In Review” state and which are in “Approved” state. In addition, this report provides the audit details of the approval workflow which includes test case details, approved test case version, who approved this test case, when was it approved, etc.

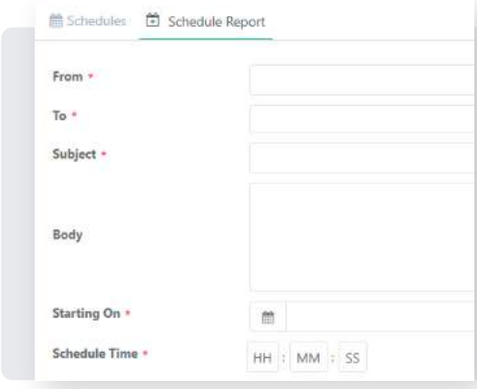


Audit Trails

✓ Change Logs

Change log is available for users to see changes done for an entry in the module — Requirement, Test Case, Test Suite, and Issue modules. The report displays what action has been taken in which entity & field, the old value and new value of that field, and by whom the changes have been made.



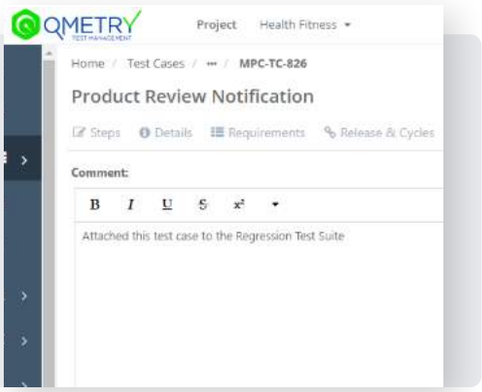


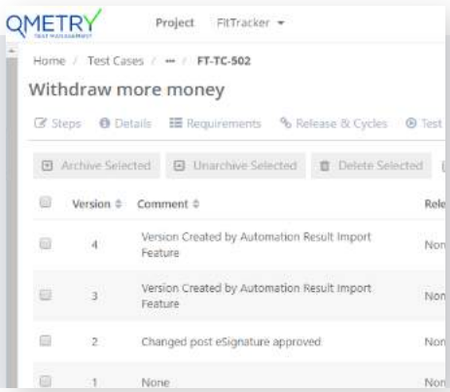
✓ Schedule Reports

QMetry understands the need of sharing these reports regularly with the concerned parties. To enable this, QMetry allows users to send these reports in the PDF format via email and they can even schedule these emails to go out automatically. Users can also check the scheduler history to view the history of scheduled reports.

✓ Add Comments

Along with these Supported features for Audit, users can provide comments for each testing artefacts such as user stories, test cases, test executions and issues. Adding comments to a test asset is a useful way to record additional detail about a test asset and collaborate with your QA team members. Comments are shown in the Comments tab on the details page when you view a test asset.





✓ Versioning

QMetry also offers creating new version of requirement and test cases. Along with creation, it also lists down previous versions from where users can go and view the details regarding any previous version. This helps in keeping track of changes done to that artefact/entry over period.

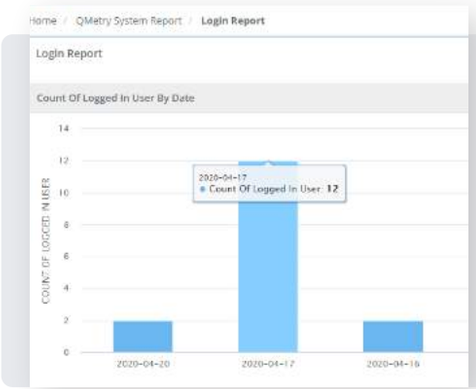
Strong Reporting

Along with test related reports, QMetry provides other important reports that are helpful as well as required as part of Regulatory Compliance. Few such reports include

✓ Reusability Report

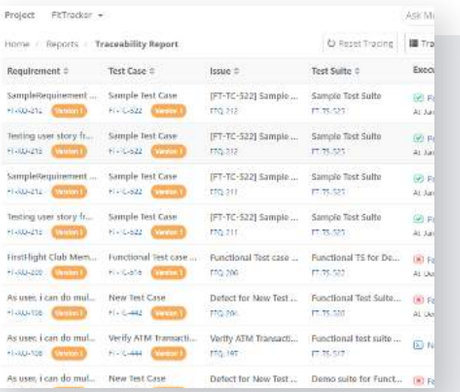
The Reusability Report is provided with the purpose to boost the efficiency of testing team with traceability, reusability and visible linkages with other test assets. Reusability of a test case refers to the number of times that particular test case is associated with different requirements across projects. QMetry allows you to associate one test case with multiple requirements in same or other projects.

Admins use this report to present the traceability and linkages within test assets for the purpose of Auditing. This whole arrangement of reusing assets also promotes effective test asset management. For the selected Project, the Reusability Report gives insights into reusability of test assets. The report displays what percentage of your test cases are linked multiple times with different requirements versus test cases which are not linked with requirements. You can also drill down to the associated requirements. For the purpose of auditing, the report gives overall picture of utilization of test cases and segregated test cases which are not reused. For ease of comprehension, it also decodes the quality of your test case reusability ratio.



✓ Login/Logout Report

This report shows the login/logout summary for selected user. Admins use this report for audit purpose on user logins & to find out any unauthorized access from unknown IP's. Important information such as what was the total logged in time, from which IP Address did user entered in this session and through which browser user logged in. This report also shows who all users are currently logged into the system.



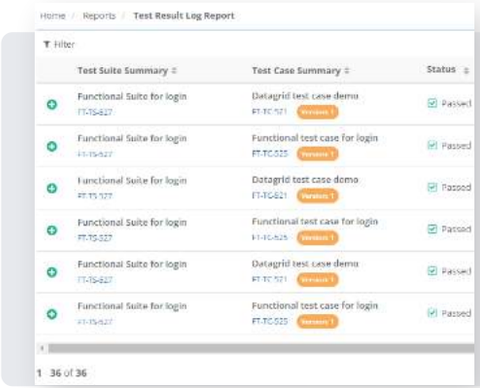
✓ Traceability Report

The Traceability Report provides the trail of Requirements – Test Cases – Issues. For the ease of generating trail, the Traceability Report is generated on the basis of Requirements that exist in the current Project.

When traced by requirements, the report displays traceability of issues with their associated test cases and associated requirements, and vice versa. Similarly, report can be generated via below three filters:

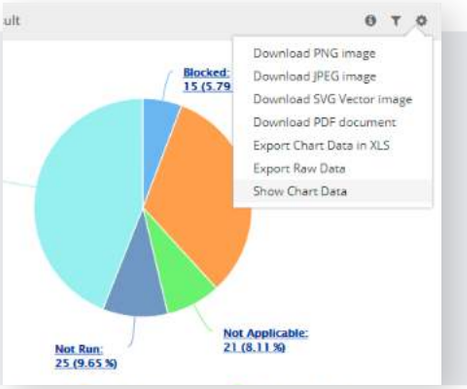
a. Trace by Requirements
b. Trace by Test Cases
c. Trace by Issues

The report shows the hierarchy of issues (Requirement > Test Case > Issue) for the current Project as well as across Projects displaying linked test assets from other Projects.



✓ Test Result Logs

The Test Result Log displays detailed information about each test. As each test completes, the status column updates with the test execution result. It generates a full-detailed log of all actions it performs during the test run. The test log provides the test run summary, indicates the results, and contains detailed information for each test operation. For testing team, this is the most important report that needs to be produced for the purpose of auditing to understand what was tested and what was the logged result.



✓ Export Reports

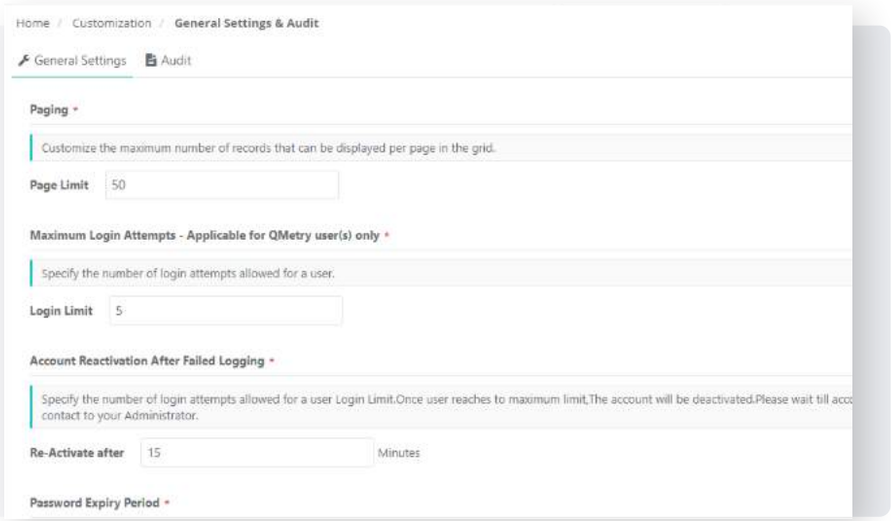
All reports along with Audit Logs and Change Logs can be exported which is useful while having them handy for reference. Exported reports contain graphs in PDF as well as PNG format while other details can also be exported in form of Excel or CSV.

Secure User Access

Along with test related reports, QMetry provides other important reports that are helpful as well as required as part of Regulatory Compliance. Few such reports include

- Limiting system access to authorized individuals
- Use of operational system checks
- Use of authority checks
- Use of device checks

QMetry understands how important the access control is and incorporating various security policies within the system.



Retention Policy for Audit Related Logs

Users can configure the number of days they require to retain information of Audit and Change Log within QMetry Test Management. They can download the logs for the days configured here. The logs can be downloaded in XLSX and CSV format.

Create User Roles to define system access and rights

The Roles module of QMetry allows Admin to create different user roles that encompass a set of assigned rights. A user role defines user's capability to access the modules and carry out functions under the role rights. On login the users will be able to view only those modules permitted to their roles. Other modules will not be visible to the users of that particular role. In case of features, they appear disabled if the role assigned to users does not have any permissions for it.

Assign roles to users based on their rights & responsibilities

Admin can create users and along with other important details, newly created user is assigned to the roles that are created. Based on this, user is permitted to access modules as well as perform certain actions. Every organization and teams have different control policies for team members. This kind of Roles and Users setup ensures that Roles are created based on the Policy requirements that is aligned to Organization's Regulatory Compliance.

Maximum Login Attempts and Lock-in Period

For the security reasons, Admin can mention the number of times a user can fail his attempt to login before he is locked out of the QMetry's system.

Password Expiry Policy

One of the most crucial compliance parts is Password should expire after certain period which is normally 30 days. Post 30 days, user's existing password expires and is forced to reset password.

Activity Notifications

QMetry provides a list of notifications based on event occurrence within the application e.g. Add Test Suite, Delete Test Suite, Add Requirement, Add Test Case, and so on. Admin can assign notifications by Role, Users and Email IDs. The receiving users can unsubscribe for notifications any time. QMetry automatically generates emails in predefined templates and notifies the respective users when the specified event occurs for the entities.

The Admin in the organization applies settings to generate email notifications automatically and send them to the respective Roles or Users with the purpose to make all the stake holders keep updated for whatever actions are being taken to their assets of interest.

This always helps organizations to keep check of all activities that are done in QMetry.

Benefits

- Helps in better readiness for Audit through Audit Trails
- Faster go-to-market with eSignature and Audit Compliance Reports
- Reauthentication to comply with 21 CFR Part 11
- Reduced risk and quicker implementation due to automated compliance workflows
- Save time by avoiding manual intervention in approval process
- Real-time access of all the testing records and artefacts at any time
- Increase in efficiency leading to improved productivity of testers
- Increase visibility and More Transparency throughout testing process
- Cost effective solution as QMetry Compliance supported features eliminate paperwork and cumbersome regulatory processes

At QMetry we believe that QMetry Test Management contains the required technical elements for a compliant system, however it is up to each customer to verify that their implementation of QMetry Test Management meets their certification needs as part of their overall quality assurance process.

Learn about various use cases of QMetry's eSignature that helps compliance driven organizations like Healthcare

eSignature Use Cases

Get Free Consultation to understand how you can empower your Agile QA teams with Continuous Testing in Healthcare Sector

Get Free Consultation

QMETRY

Disclaimer

It is not possible for any vendor to offer a turnkey 'Part 11 compliant system'. Any vendor who makes such a claim is incorrect. Part 11 requires both procedural controls (i.e. notification, training, SOPs, administration) and administrative controls to be put in place by the user in addition to the technical controls that the vendor can offer. At best, the vendor can offer an application containing the required technical elements of a compliant system.

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